AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1. (Currently Amended): A method of forming a micro pattern comprising steps of:

(a) coating photosensitive resist material over a substrate and exposing and developing the photosensitive resist material to form a resist pattern;

(b) etching a surface layer of sidewalls and a top wall of the resist pattern by plasma of a mixture gas comprising a first gas and an SO_2 gas, the first gas comprising at least one gas selected from the group consisting of He, Ne, Ar, Xe, Kr, CO, CO_2 and N_2;

wherein in the step (b), a flow rate of the first gas is equal to or larger than 40 % of a flow rate of the mixture gas;

wherein the substrate has an antireflection film made of organic substance and formed over an underlying surface;

in the step (b), the surface layer of the resist pattern is etched, and by using the resist pattern as a mask, the antireflection film is etched to be patterned; and

wherein a partial area of the underlying surface is covered with the antireflection film patterned in the step (b), and the underlying surface exposed ~~after etching the antireflection film~~ and not covered with the antireflection film patterned in the step (b) is larger than a surface of the antireflection film exposed and not covered with the resist pattern after ~~developing the photosensitive resist material~~ the step (a) and before the step (b).

2. (Original): A method of forming a micro pattern according to claim 1, wherein the mixture gas additionally comprises an O_2 gas.

3. (Cancelled).

4. (Original): A method of forming a micro pattern according to claim 1, wherein in the step (b), the etching is performed in a state that a temperature of the substrate is maintained at 40 °C or lower.

5. (Cancelled)

6. (Previously Presented): A method of forming a micro pattern according to claim 1, wherein the mixture gas comprises an O_2 gas.

7. (Original): A method of forming a micro pattern according to claim 6, wherein the step (b) includes a step of increasing a ratio of a flow rate of the SO_2 gas to a flow rate of the O_2 gas during the etching.

8. (Original): A method of forming a micro pattern according to claim 7, wherein in the step (b), the flow rate ratio of the SO_2 gas is increased when the time necessary for etching a whole thickness of the antireflection film lapses.

9. (Original): A method of forming a micro pattern according to claim 2, wherein:

the substrate has an antireflection film made of organic substance and formed over an underlying surface; and

in the step (b), the surface layer of the resist pattern is etched, and by using the resist pattern as a mask, the antireflection film is etched.

10. (Currently Amended): A method of manufacturing a semiconductor device comprising steps of:

(i) forming a first film over a semiconductor substrate;

(j) forming an antireflection film made of organic substance over the first film;

(k) forming a resist film made of photosensitive resist material over the antireflection film;

(l) exposing and developing the resist film to form a resist pattern;

(m) etching a surface layer of sidewalls and a top wall of the resist pattern by plasma of a mixture gas comprising a first gas and an SO_2 gas, the first gas comprising at least one gas selected from the group consisting of He, Ne, Ar, Xe, Kr, CO, CO_2 and N_2, and by using the resist pattern as a mask, patterning the antireflection film;

(n) etching the first film by using as a mask the resist pattern whose surface layer was etched and the patterned antireflection film;

(o) removing the resist pattern and the antireflection film;

wherein in the step (m), a flow rate of the first gas is equal to or larger than 40 % of a flow rate of the mixture gas; and

wherein a surface of the first film exposed after ~~patterning the antireflection film~~ the step (m) and before the step (n) is larger than the surface of the antireflection film exposed after ~~developing the resist film~~ the step (l) and before the step (m).

11. (Original): A method of manufacturing a semiconductor device according to claim 10, wherein:

the step (i) comprises a step of forming a second film over the semiconductor substrate and forming the first film over the second film; and

the method further comprises a step of etching the second film by using the first film as a hard mask, after the step (n).

12. (Original): A method of manufacturing a semiconductor device according to claim 10, wherein the mixture gas additionally comprises an O_2 gas.

13. (Cancelled).

14. (Original): A method of manufacturing a semiconductor device according to claim 10, wherein in the step (m), the etching is performed in a state that a temperature of the substrate is maintained at 40 °C or lower.

15. (Original): A method of manufacturing a semiconductor device according to claim 10, wherein the mixture gas comprises an O_2 gas and the step (m) comprises a step of increasing a ratio of a flow rate of the SO_2 gas to a flow rate of the O_2 gas during the etching.

16. (Original): A method of manufacturing a semiconductor device according to claim 15, wherein in the step (m), the flow rate ratio of the SO_2 gas is increased when the time necessary for etching a whole thickness of the antireflection film lapses.

17-18. (Cancelled).

19. (Currently Amended): A method of manufacturing a semiconductor device comprising steps of:

forming a first film over a semiconductor substrate;

forming an antireflection film made of organic substance over the first film;

forming a resist film made of photosensitive resist material over the antireflection film;

exposing and developing the resist film to form a resist pattern;

etching a surface layer of sidewalls and a top wall of the resist pattern by plasma of a mixture gas comprising a first gas and a second gas, and patterning the antireflection film by using the resist pattern as a mask, the first gas comprising at least one gas selected from the

group consisting of He, Ne, Ar, Xe, Kr, CO, CO_2 and N_2, and the second gas forming polymer that comprises sulfur;

etching the first film by using as a mask the resist pattern whose surface layer was etched and the patterned antireflection film;

removing the resist pattern and the antireflection film; wherein the mixture gas further comprises an O_2 gas; and

wherein a surface of the first film exposed after patterning the antireflection film and before removing the antireflection film is larger than the surface of the antireflection film exposed after developing the resist film and before patterning the antireflection film.

20. (Cancelled).

21. (Original): A method of forming a micro pattern according to claim 11, wherein a gate electrode is formed by etching the second film, and further comprising a step of implanting ions to form source and drain regions after the step (o).

22. (Previously Presented): A method of forming a micro pattern according to claim 1, wherein said photosensitive resist material and said antireflection film are over-etched after a whole thickness of the antireflection film is etched.

23. (Previously presented): A method of forming a micro pattern according to claim 1, wherein the etching of the resist pattern reduces the width of the resist pattern.

24. (Previously presented): A method of manufacturing a semiconductor device according to claim 10, wherein the etching of the resist pattern reduces the width of the resist pattern.

25. (Cancelled)

26. (Previously presented): A method of manufacturing a semiconductor device according to claim 19, wherein the etching of the resist pattern reduces the width of the resist pattern.

27-33. (Cancelled)